MECHANIC STREET BRIDGE
(Israel River Bridge)
National Covered Bridges Recording Project
Spanning Israel River
Lancaster
Coos County
New Hampshire

HAER NH-45
NH-45

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

MECHANIC STREET BRIDGE
(Israel River Bridge)

HAER No. NH-45

LOCATION:	Spanning Israel River at Mechanic Street, Lancaster, Coos County, New Hampshire[1] UTM: 19.296097.4929146, Lancaster, New Hampshire Quad.
STRUCTURAL TYPE:	Wood covered bridge; Paddleford truss
DATE OF CONSTRUCTION:	Traditionally dated 1862[2]
DESIGNER/ BUILDER:	Unknown
PRESENT OWNER:	Town of Lancaster, New Hampshire
PRESENT USE:	Vehicular bridge
SIGNIFICANCE:	The Mechanic Street Bridge is an excellent example of the bridge truss developed in the 1840s by Peter Paddleford of Littleton, New Hampshire. The design features a multiple kingpost truss with long counterbraces that helped to distribute loads throughout the truss. Though never patented, the Paddleford truss dominated covered bridge construction in northern New England for over half a century.
HISTORIAN:	Researched and written by Lola Bennett, Summer 2004
PROJECT INFORMATION:	The National Covered Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. HAER is administered by the Historic American Buildings Survey/Historic American Engineering Record, a division of the National

[1] Also known as "Israel's River."

[2] While most secondary sources (including a modern sign over the bridge portal) state that the Mechanic Street Bridge was built in 1862, no written records have been found to conclusively confirm this date. According to information gleaned from primary sources, including local newspapers and town records, construction began in the late summer or early fall of 1859. The bridge was completed sometime prior to July 1862, leaving open the possibility that the structure could have been completed a year or two earlier than previously thought.

Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project.

Chronology

1763 Lancaster, New Hampshire, settled

1785 Peter Paddleford born at Enfield, New Hampshire

1790 First bridge built across Israel River at Main Street

1805 America's first covered bridge built at Philadelphia

1830 Long truss patented

1846 Peter Paddleford builds first Paddleford truss bridge at Conway, New Hampshire

1852 Mechanic Street laid out as a public way from Main Street to Israel River

1859 Mechanic Street extended across Israel River

1859 Construction of Mechanic Street Bridge begins

1859 Peter Paddleford dies

1861 H.E. Walling's map of New Hampshire shows Mechanic Street crossing Israel River

1862 Mechanic Street Bridge completed sometime before July 1862

1967 New Hampshire Department of Public Works rehabilitates Mechanic Street Bridge

2003 Mechanic Street Bridge recorded by the Historic American Engineering Record

2004 New Hampshire Department of Public Works rehabilitates Mechanic Street Bridge

Description

The Mechanic Street Bridge is a single-span wood covered bridge on concrete abutments.[3] The bridge is 94' long and 23' wide, with a clear span of 79' and a roadway width of 19'. The trusses are 13'-10" high. Vertical clearance is 11'-8".

The truss geometry is similar to that of a multiple kingpost truss, but with counterbraces that span about one-and-one-half panels. The ten main panels are 8'-0" wide on center, while the end panels are 5'-8". The upper chords are composed of three planks laid on edge and pinned together with treenails. The lower chords are inaccessible for measuring. Vertical posts, which vary from 7"x9" at the center to 8"x10" at the ends, connect the chords. They are notched and bolted at the chords. There are diagonal 4-1/2"x 8-1/2" braces that angle up toward the center of the bridge seated in notches at the top and bottom of the posts. The counterbraces angle down toward the center of the bridge and are pinned and notched at each intersection. The upper lateral bracing system consists of tie beams and cross braces tightened with wedges. The deck is 3"x11" rough sawn planks laid longitudinally on 3-1/2"x14" transverse deck beams spaced every 1'-4".

The housing is typical of New Hampshire covered bridges. The upper portion of the trusses is exposed, while vertical plank siding covers the lower portion. The portals are open below the gable, which has curved wings extending to the eaves and decorative trim boards along the edges. The bridge has a gable roof covered with corrugated metal.

History of Bridge and Site

Settled in 1763, the present-day town of Lancaster, New Hampshire, depended on Israel River for sustenance and transportation in its early years. The river also powered small industries, including a tannery, a blacksmith shop, a saw mill and a grist mill.[4] Due to its remote location and the lack of roads, the village had grown to only a few dozen residents after twenty years. In 1787, Jonas Wilder, Edward Bucknam and Emmons Stockwell petitioned the New Hampshire General Assembly for permission to levy and collect taxes from local landholders, stating "*Nothing more effectually hinders the emigration of inhabitants to this part of the State than the badness of our roads and the want of a convenient place to worship.*"[5] The General Assembly approved the petition, and the resulting tax revenue enabled the town to begin a systematic program of road building that proved a great boon to the community. Within three years, the

[3] The bridge spanning Israel River at Main Street in Lancaster was also known by this name.
[4] Maj. Jonas Wilder established this mill in 1781. By 1826, it was known as Chesman's Mill, and sometime later, Wesson Mill.
[5] State of New Hampshire, *State Papers* 21, p.178-339.

population more than doubled.[6] In 1790, the town built its first bridge across Israel River at Main Street.[7]

The first dwellings in the area were scattered, but in the early nineteenth century, settlement began to expand along the river. A map of Lancaster Village drawn by J.W. Weeks in 1826 shows several buildings at what is today the west end of Mechanic Street. In 1852, the town selectmen laid out present-day Mechanic Street from Main Street, along the south side of Israel River, to the Wesson Mill dam, located at a distinct bend in the river.[8] According to several secondary sources, there was a wood bridge at this site prior to the present covered bridge, but no written records have been found to confirm this.

Construction of the present covered bridge took place between 1859 and 1862, when Mechanic Street was extended easterly across the river to connect with Middle Street.[9] In September 1859, the *Coos Republican* reported:

> *Ground has been broken through Mr. Joyslin's land for the continuation of the street leading from the Town Hall to the house of Gilman Colby. We learn that the bridge is commenced, and that it is hoped to open that avenue for traveling and building purposes as soon as the work can be consistently accomplished.*[10]

No further detail of construction have been found, including the builder's name, but the Mechanic Street Bridge was completed sometime prior to July 1862, when the town voted to post signs "on each end of the bridge to be built on Main Street also on each end of the new bridge on Mechanic Street prohibiting the riding across said bridges faster than a walk."[11]

The Mechanic Street Bridge has served the community of Lancaster for nearly 150 years. The bridge was rehabilitated in 1967 and 2004. It continues to carry a heavy volume of vehicular and pedestrian traffic.

---

[6] Rev. A.N. Somers, *History of Lancaster, New Hampshire* (Concord, New Hampshire: Rumford Press, 1898), p.56.
[7] The Main Street bridge, known as Stockwell's Bridge, or Israel River Bridge, was rebuilt/replaced in 1805, 1837, 1848, 1862, 1888 and 1895.
[8] *Lancaster Road Book*, p.75.
[9] *Lancaster Town Records*, May 10, 1859.
[10] The same builder who constructed the Mechanic Street Bridge may have built the Main Street Bridge (Stockwell Bridge; Israel River Bridge) in Lancaster, or the Stark Bridge, both of which were built in 1862. The bridge on Main Street referred to in the quote was a covered bridge built in 1862. Historic photographs indicate that the Main Street Bridge was a double-barrel Paddleford truss covered bridge, quite similar in appearance to the Mechanic Street Bridge. The 1862-63 *Lancaster Town Report* shows a payment of $2,610 "for new bridges," but does not indicate which bridges are included or to whom the payment was made. Quote from *What's News in Coos County*, Volume II, by Milli S. Kenney (Bowie, Maryland: Heritage Books, Inc., 1996), p.323.
[11] *Lancaster Town Records*, July 10, 1862, p.47.

Peter Paddleford and the Paddleford Truss

The Mechanic Street Bridge is an excellent example of the bridge truss developed by Peter Paddleford (1785-1859), an important mid-nineteenth century bridge builder and millwright in northern New England. Born at Enfield, New Hampshire, Paddleford moved north as a young man, eventually settling in Littleton, New Hampshire in 1830. He built several important bridges, including one at Plymouth, New Hampshire and two across the Connecticut River at Monroe and Northumberland, as well as numerous smaller bridges in the upper reaches of Vermont and New Hampshire.

Initially, Paddleford used the Long truss for his bridges, but in the mid 1840s, he developed his own truss design, using a multiple kingpost with counterbraces overlapping the panel points.[12] The long counterbraces helped distribute loads throughout the truss and increase the structure's rigidity. Although never patented, regional bridge builders like Jacob Berry and Charles and Frank Broughton used the Paddleford truss for over half a century. Peter Paddleford retired in 1849, but his son and business partner, Philip H. Paddleford, continued building bridges based on his father's design.[13] According to the National Society for the Preservation of Covered Bridges' *World Guide to Covered Bridges*, twenty-one Paddleford truss covered bridges still survive in northern New England (see Appendix A).[14]

---

[12] Joel's Bridge (1846) at Conway, New Hampshire, is thought to be the first Paddleford truss bridge. According to covered bridge historian Joseph Conwill, potential sources of inspiration for Peter Paddleford's idea *could* have come from nearby covered bridges at Bath, New Hampshire or Thetford Center, Vermont, both of which have braces that overlap the panel points, or from George W. Thayer's 1845 patent for adjusting bridges that showed a truss profile resembling Paddleford's design.

[13] Historian Richard Roy of Manchester, New Hampshire, has compiled a list of more than 79 Paddleford truss bridges (past and present).

[14] National Society for the Preservation of Covered Bridges, *World Guide to Covered Bridges* database printout, 2002.

Appendix A, Table of Remaining Paddleford Truss Bridges
From National Society for the Preservation of Covered Bridges, *World Guide to Covered Bridges*, database printout, 2002.

Lovejoy Bridge	Andover, Oxford County, ME	1867	1-80'	
Hemlock Bridge	Fryeburg, Oxford County, ME	1857	1-116'	
Bennett Bridge	Lincoln Plantation, Oxford County, ME	1898	1-100'	Mason Brothers
Sunday River Bridge[15]	Newry, Oxford County, ME	1872	1-100'	Hiram York
Porter-Parsonfield Bridge	Porter, Oxford County, ME	1876	2-160'	
Whittier Bridge	Albany, Carroll County, NH	1870	1-133'	Jacob Berry
Swift River Bridge	Albany, Carroll County, NH	1870	1-129'	Jacob Berry
Bartlett Bridge	Bartlett, Carroll County, NH	1851	1-145'	
Saco River Bridge	Conway, Carroll County, NH	1890	2-224'	Charles/Frank Broughton
Honeymoon Bridge[16]	Jackson, Carroll County, NH	1876	1-121'	Charles/Frank Broughton
Whittier Bridge	Ossipee, Carroll County, NH	1870s	1-144'	Jacob Berry
Durgin Bridge	Sandwich, Carroll County, NH	1869	1-96'	Jacob Berry
Clarksville Bridge	Clarksville-Pittsburg, Coos County, NH	1876	1-89'	
Mechanic Street Bridge	Lancaster, Coos County, NH	1862	1-94'	
Groveton Bridge	Northumberland, Coos County, NH	1852	1-126'	Capt. Charles Richardson
Happy Corner Bridge	Pittsburg, Coos County, NH	c1850	1-86'	
Stark Village Bridge	Stark, Coos County, NH	1862	2-134'	Capt. Charles Richardson?
Flume Bridge	Lincoln, Grafton County, NH	1871	1-50'	Lincoln Turnpike Company
Swiftwater Bridge	Bath, Grafton County, NH	1849	2-162'	
Lord's Creek Bridge	Irasburg, Lamoille County, VT	1881	1-50'	John D. Colton
Sanborn Bridge	Caledonia County, Lyndon, VT	1867	1-117'	

[15] See HAER No. ME-69, Sunday River Bridge (Artist's Bridge).
[16] See HAER No. NH-41, Jackson Bridge (Honeymoon Bridge).

Sources

Allen, Richard Sanders. *Covered Bridges of the Northeast*. Brattleboro, Vermont: Stephen Greene Press, 1957.

American Society of Civil Engineers Committee on History and Heritage. *American Wooden Bridges*. New York: American Society of Civil Engineers, 1976.

Bacon, George F. *Northern New Hampshire and its Leading Businessmen*. Boston: Mercantile Publishing Company, 1890.

Conwill, Joseph D. "Notes on the Paddleford Truss." *Covered Bridge Topics* 55 (Winter 1997).

Jackson, James R. *History of Littleton, New Hampshire*. Littleton: Town of Littleton, 1905.

James, J.G. "The Evolution of Wooden Bridge Trusses to 1850." *Institute of Wood Science Journal* 9 (June and December, 1982).

Town of Lancaster, New Hampshire. *Annual Reports*, 1872-present.

Lancaster Sketchbook Committee. *A Bicentennial Sketchbook: Lancaster, New Hampshire, 1764-1964*. Lancaster, New Hampshire: *Democrat* Press, 1964.

Poole, A.F. "Bird's Eye View of the Village of Lancaster." Beck & Pauli, Lithographers, 1883.

Somers, Rev. A.N. *History of Lancaster, New Hampshire*. Concord, New Hampshire: The Rumford Press, 1898.

Town and City Atlas of New Hampshire. Boston: D.H. Hurd & Company, 1892.

Walling, H.F. *Atlas of the State of New Hampshire*. New York: Comstock & Company, 1877.

White, Edward W. *Covered Bridges of New Hampshire*. Plymouth, New Hampshire: Courier Printing Company, 1942.

Yerrinton, J.M.W. *The Centennial Celebration of the Settlement of the Town of Lancaster, New Hampshire*. Lancaster: E. Savage, 1864.